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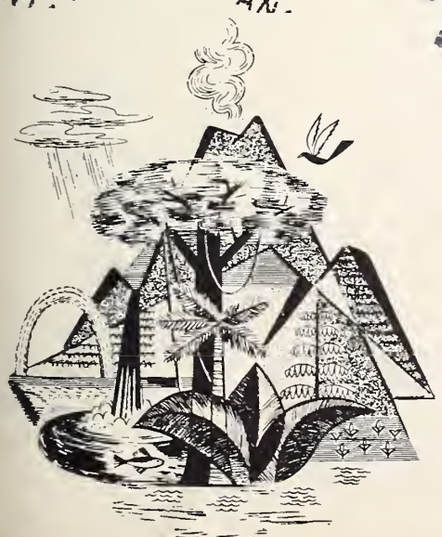
A Record of Forest Plantings in Hawaii

Robert E. Nelson



Pacific Southwest Forest and Range
Experiment Station · Berkeley, California
Forest Service · U. S. Department of Agriculture

Contents

The Author

ROBERT E. NELSON is chief of the Station's Hawaii Research Center, headquartered in Honolulu. He joined the Forest Service in 1941, after earning a bachelor's degree in forestry at the University of California. In 1946 he began working on the Station's forest survey of California. Three years later he became field supervisor of the State Cooperative Soil-Vegetation Survey, which is mapping and classifying upland soils and vegetation in California. Since 1957, he has been in charge of the Station's Hawaii office. This unit, in cooperation with the Hawaii Forestry Division, recently completed the first survey of the State's forest resources.

Few areas in the world have so many introduced plants as the Hawaiian Islands. Government agencies, private organizations, and many individuals have engaged in sometimes major efforts to bring in useful species. Introducing new species for forestry purposes began well before the turn of the century and is still continuing. Follow-up appraisal of the adaptability of introduced trees forms an important part of forestry research.

The Hawaii Forestry Division (and its predecessor agencies) has probably been the most active in tree introduction work. As early as 1887 Walker (1887) reported that "The Government Plantation on the hills between Makiki and Pauoa... now contains... about 200,000 trees of useful species which have by selection from a much larger number experimented upon, been cultivated as amongst those found to flourish in this climate...." In 1912, Ralph S. Hosmer, Superintendent of Forestry, emphasized: "An important phase of forest work in Hawaii is the introduction into the Territory of exotic trees of economic importance. This is a line of investigation that should receive much greater attention than has been given it in recent years" (Hawaii Board of Commissioners of Agriculture and Forestry 1912). In the same report he described some experimental plantings. Such tree introduction work has continued over the years; the Waiakea Arboretum in Hilo includes the latest major group of introduced species (Richmond 1963).

Many but not all of the introduced species have been appraised for forestry purposes. In 1886, Lubker (1886) wrote of Acacia dealbata and A. pycnantha: "...already it is plain, that there cannot be any other kinds of trees, which are better adapted to these islands for the purpose of Arbor culture...." Zschokke (1930) reviewed the adaptability and use of several species, mainly as windbreaks and for erosion control and fuelwood. Bryan (1947) made a significant contribution by rating the adaptability and use of most species introduced to the Big Island up to 1946. Carlson and Bryan (1959) provided detailed information about several important timber species.

No sustained efforts have been made to maintain organized records of all introductions throughout the Islands. Nor has an organized attempt been made to evaluate their adaptability on the many different sites in Hawaii. Among the many hundreds of introductions are possibly some valuable "sleepers." Similarly, some potentially valuable species that could and should be brought in have, no doubt, been overlooked.

Need for Appraisal

Plans for the initial Forest Survey in Hawaii pointed out the need for a systematic appraisal of past forest plantings, to gain full benefit from previous work and to guide future research[1]. This appraisal is now underway. Its objectives are to compile organized records of:

- Where and when each species was planted and the number planted.
- Adaptability of species as related to site factors.
- Suitability of tree species for timber production, based on growth, form, and wood quality.

The over-all purpose is to provide a reference to aid in selecting the best kinds of trees to grow for timber production and other forestry purposes on different sites in Hawaii. Underway is field appraisal of past plantings--the most important phase of this work.

Preparatory to the field work, we compiled available information about plantings made by the Hawaii Division of Forestry[2]. We extracted and coded information from three sources: (a) Card records maintained by the Hawaii Division of Forestry from 1917-1954; (b) monthly Forestry Division reports from 1954 to 1960; and (c) annual Forestry Division reports before 1917. Records and reports earlier than 1908 did not yield information useful for this compilation. Although introduced species have been favored in the plantings, several native species were also planted and we included these in our compilation. We included plants other than trees too, for as complete a record as possible.

Other agencies and individuals have records of tree plantings, but we have not yet tapped these sources.

Ideally we wanted accurate information on species identity, location of field plantings, number of seedlings planted, and dates of plantings. We recognized that the original records contain omissions, errors, and duplications. A serious handicap is the lack of information about precise locations of outplantings. Synonyms and errors in plant naming are troublesome. But the wealth of information available far outweighs any problems of extraction.

Arrangement of Data

The data obtained were transferred to punch cards from which two primary tabular listings have been compiled to guide and facilitate the actual species appraisal work.

One listing begins with the species Abelia chinensis, only two plants of which were planted. The next species in this listing is Aberia gardneri, a shrubby tree planted at 28 locations in 18 Forest Reserves.

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[1]Nelson, Robert E. Plan for an initial survey of the timber resource in the Territory of Hawaii. 1958. (Unpublished report on file at Pacific SW. Forest & Range Expt. Sta., U. S. Forest Serv., Honolulu, Hawaii.)

[2]Most of the staff of the Forest Service's Forestry Research Center, Hawaii, participated to some degree in compiling this information. Roger G. Skolmen and Ronald M. Lanner extracted and coded most of the recorded information.

Between 1928 and 1941 a total of 16,088 plants of A. gardneri were planted. This list ends with Zizyphus jujuba, a small tree; 51 plants of this species were set out in only one location on Oahu in 1926. All told, nearly 1,100 species are listed as planted from 1908 to 1960. Of this total, about 800 are tree species; the balance are shrubs, vines, herbs, ferns, grasses, or palms. This listing also shows 136 plantings made, involving nearly 27,000 plants, in which the species are not identified.

Another arrangement of the data lists the plantings in each Forest Reserve. It shows for example, that 55 tree species and 2 shrub species have been planted in the Kalepa Reserve on the Island of Kauai. About 48,000 plants were set out in all in this Reserve between 1944 and 1958. This listing also shows that 1,198,000 plants have been set out in the Honolulu Forest Reserve.

From limited literature review and first hand knowledge, each listed species has been tentatively rated for probable silvical adaptability in Hawaii and for its use potential for wood products. These preliminary "value" ratings, as well as information on location and number of trees planted, provide the basis for screening species and selecting plantings for field appraisal.

We have gathered this information about the planting work of the Forestry Division primarily to enable us to evaluate and select the best tree species for forestry purposes in Hawaii. As information from field evaluations becomes available it will be reported. Meantime the information already compiled serves as a valuable reference for investigators and others in research. Part of this organized reference material is summarized in the appendix that follows.

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Appendix

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1]

Genera[2]	Family[3]	No. of species	No. planted	Growth form[4]
Abelia (Linnaea)	Caprifoliaceae	1	2	S
Aberia (Donyalis)	Flacourtiaceae	1	16,088	T,S
Abies	Pinaceae	5	359	T
Abutilon	Malvaceae	2	10	S
Acacia	Leguminosae	20	1,547,413	T,S
Acalypha	Euphorbiaceae	1	2	S
Acer	Aceraceae	4	361	T
Achras	Sapotaceae	1	300	T
Ackama	Cunoniaceae	1	89	T
Acoelorraphe	Palmae	1	3	P
Acrocarpus	Leguminosae	1	312	T
Actinidia	Dilleniaceae	1	2	S
Actinophloeus (Drymophloeus)	Palmae	1	3	P
Adansonia	Bombacaceae	1	188	T
Adenanthera	Leguminosae	1	1,406	T
Aegle	Rutaceae	1	12	T
Aesculus	Hippocastanaceae	1	7	T,S
Aframomum	Zingiberaceae	1	6	H
Afzelia	Leguminosae	1	1	T
Agathis	Pinaceae	4	2,228	T
Agave	Amaryllidaceae	1	1,600	S
Ailanthus	Simarubaceae	1	1,740	T
Ajuga	Labiatae	*	4	H
Albizia (Albizzia)	Leguminosae	14	303,795	T
Alectryon	Sapindaceae	1	1	T
Aleurites	Euphorbiaceae	3	16,433	T
Allamanda	Apocynaceae	1	214	S
Alnus	Betulaceae	5	44,113	T
Alocasia	Araceae	2	9	H
Alpinia	Zingiberaceae	2	140	H
Alyxia	Apocynaceae	1	10	V
Amoora	Meliaceae	2	43	T
Anacardium	Anacardiaceae	1	773	T
Andira	Leguminosae	1	40	T
Angiopteris	Marrattiaceae	1	1	F
Angophora	Myrtaceae	2	21,451	T
Anona	Anonaceae	5	821	T,S
Anthurium	Araceae	1	1	H
Antidesma	Euphorbiaceae	2	15	T
Aphanamixis	Meliaceae	2	32	T
Aphelandra	Acanthaceae	1	70	S
Aralia	Araliaceae	1	6	S

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera[2]	Family[3]	No. of species	No. planted	Growth form[4]
Araucaria	Pinaceae	7	153,829	T
Arbutus	Ericaceae	1	8	T
Archontophoenix	Palmae	1	17	P
Ardisia	Myrsinaceae	2	251	S,T
Areca	Palmae	1	2	P
Arenga	Palmae	1	2	P
Argania	Sapotaceae	1	1	T
Argyroxiphium	Compositae	1	50	H
Artocarpus	Moraceae	5	2,749	T
Aspidistra	Liliaceae	1	16	H
Azalea	Ericaceae	1	307	S
Baccharis	Compositae	1	6	S
Bambusa	Gramineae	2	7,450	G
Baphia	Leguminosae	1	1	T
Barringtonia	Lecythidaceae	2	47	T
Bassia (Illipe)	Sapotaceae	1	1	T
Bauhinia	Leguminosae	14	716	T,S,V
Begonia	Begoniaceae	*	72	H
Beloperone	Acanthaceae	1	3	S
Betula	Betulaceae	1	30	T
Bidens	Compositae	1	4	H
Bignonia	Bignoniaceae	*	4	H
Bischofia	Euphorbiaceae	1	6,553	T
Bixa	Bixaceae	1	96	T
Blighia	Sapindaceae	1	9	T
Bocconia	Papaveraceae	1	4	S
Bombax	Bombacaceae	3	720	T
Bombycidendron (Hibiscus)	Malvaceae	2	263	T
Bougainvillea	Nyctaginaceae	*	11	S,V
Brachychiton	Sterculiaceae	5	4,399	T
Brassaia	Araliaceae	2	1,489	T
Brexia	Saxifragaceae	1	19	T
Breynia	Euphorbiaceae	1	24	S
Bridelia	Euphorbiaceae	2	382	T
Broussonetia	Moraceae	1	18	T
Brownea	Leguminosae	2	5	T
Bruguiera	Rhizophoraceae	1	133	T
Bucida	Combretaceae	1	2	T
Bucklandia	Hamamelidaceae	1	8	T
Bumelia	Sapotaceae	1	2,791	T
Butea	Leguminosae	1	152	T
Cactus	Cactaceae	*	2	H
Caesalpinia	Leguminosae	2	208	T,S
Calamus	Palmae	1	2	P

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera[2]	Family[3]	No. of species	No. planted	Growth form[4]
Calliandra	Leguminosae	2	63	S
Callicarpa	Verbenaceae	1	17	S
Callistemon	Myrtaceae	2	3,105	S,T
Callitris	Pinaceae	7	6,183	T
Calocarpum (Lucuma)	Sapotaceae	1	2	T
Calodendrum	Rutaceae	1	56	T
Calophyllum	Guttiferae	5	1,751	T
Calotropis	Asclepiadaceae	1	16	S
Calpurnia	Leguminosae	1	2	S
Calycophyllum	Rubiaceae	1	11	T
Camellia (Thea)	Theaceae	3	30	S
Cananga (Canangium)	Anonaceae	1	41	T
Canarium	Burseraceae	3	24	T
Canthium (Plectronia)	Rubiaceae	1	227	S
Carica	Caricaceae	1	103	T,S
Carludovica	Cyclanthaceae	1	358	S
Carya	Juglandaceae	3	514	T
Caryota	Palmae	1	6	P
Casimiroa	Rutaceae	1	460	T
Cassia	Leguminosae	16	3,436	T,S
Castanea	Fagaceae	5	650	T,S
Castanospermum	Leguminosae	1	1,187	T
Castilla (Castilloa)	Moraceae	1	42	T
Casuarina	Casuarinaceae	13	1,136,217	T
Catalpa	Bignoniaceae	3	3,621	T
Cavanillesia	Bombacaceae	1	56	T
Cecropia	Moraceae	1	752	T
Cedrela	Meliaceae	3	3,549	T
Cedrus	Pinaceae	1	102	T
Ceiba	Bombacaceae	1	1,662	T
Celtis	Ulmaceae	2	2	T,S
Centrolobium	Leguminosae	1	1	T
Ceodes (Pisonia)	Nyctaginaceae	1	4	T
Ceratonia	Leguminosae	1	9	T
Cerbera	Apocynaceae	1	3	T
Cercis	Leguminosae	1	42	T
Cestrum	Solanaceae	2	235	S
Chaenomeles (Cydonia)	Rosaceae	1	1	S
Chamaecyparis	Pinaceae	5	56,656	T
Chamaedorea	Palmae	1	10	P
Chamaefistula (Cassia)	Leguminosae	1	1	T,S
Charpentiera	Amarantaceae	1	3	T,S
Chiranthodendron	Sterculiaceae	1	5	T
Chorisia	Bombacaceae	1	4	T

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera[2]	Family[3]	No. of species	No. planted	Growth form[4]
Chrysalidocarpus (Hyophorbe)	Palmae	1	61	P
Cibotium	Cyatheaceae	1	27	F
Cinnamomum	Lauraceae	3	5,116	T
Cipadessa	Meliaceae	*	20	S
Citharexylum	Verbenaceae	1	367	T
Citrullus	Cucurbitaceae	1	26	V
Citrus	Rutaceae	*	8,798	T,S
Cladium	Cyperaceae	1	230	H
Claoxylon	Euphorbiaceae	1	1	S
Clematis	Ranunculaceae	*	2	V
Clerodendron	Verbenaceae	2	1,894	T,S
Clusia	Guttiferae	1	60	T
Coccoloba	Polygonaceae	1	995	T,S
Cochlospermum	Cochlospermaceae	1	83	T
Cocos	Palmae	*	25,452	P
Coelococcus	Palmae	1	17	P
Coffea	Rubiaceae	2	366	T,S
Colensoa (Pratia)	Campanulaceae	1	6	H
Colubrina	Rhamnaceae	2	2,436	T,S
Colutea	Leguminosae	1	27	S
Colvillea	Leguminosae	1	1	T
Congea	Verbenaceae	1	2	S
Conocarpus(Leucadendron)	Proteaceae	1	84	T,S
Copaifera	Leguminosae	1	46	T
Coprosma	Rubiaceae	*	1	S
Cordia	Borraginaceae	10	2,844	T
Cordyline	Liliaceae	2	118,460	H,S
Cornus	Cornaceae	1	4	T,S
Corylus	Betulaceae	2	14	S
Corynocarpus	Corynocarpaceae	1	5,145	T
Costus	Zingiberaceae	1	24	S
Cotoneaster	Rosaceae	4	150	S
Crescentia	Bignoniaceae	1	2,290	T
Cryptomeria	Pinaceae	1	499,306	T
Cryptostegia	Asclepiadaceae	1	233	V,S
Cunninghamia	Pinaceae	1	11,040	T
Cupressus	Pinaceae	12	254,273	T
Cuscuta	Convolvulaceae	1	287	V
Cyanea	Campanulaceae	2	8	S
Cydonia	Rosaceae	1	29	T
Cynometra	Leguminosae	1	100	T,S
Cyperus	Cyperaceae	1	9	G
Cyphomandra	Solanaceae	1	12	S
Dacrydium	Taxaceae	1	4	T

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera[2]	Family[3]	No. of species	No. planted	Growth form[4]
Dalbergia	Leguminosae	3	588	T
Datura	Solanaceae	1	1	S
Deguelia (Derris)	Leguminosae	*	*	*
Dendrocalamus	Gramineae	1	36	G
Desmoncus	Palmae	1	2	P
Dieffenbachia	Araceae	*	24	H
Dillenia	Dilleniaceae	1	21	T
Diospyros	Ebenaceae	5	718	T,S
Diplotropis	Leguminosae	1	25	T
Dipterocarpus	Dipterocarpaceae	1	1	T
Dodonaea	Sapindaceae	2	4,115	S
Dolichandrone	Bignoniaceae	2	408	T
Dombeya	Sterculiaceae	*	1	T,S
Duranta	Verbenaceae	1	153	S
Durio	Malvaceae	1	7	T
Elaeocarpus	Elaeocarpaceae	1	36	T
Elaeodendron	Celastraceae	1	86	T,S
Entandrophragma	Meliaceae	1	224	T
Enterolobium	Leguminosae	1	16,067	T
Eranthemum	Acanthaceae	1	2	S
Eriobotrya	Rosaceae	1	826	T
Eriogonum	Polygonaceae	1	16	S
Erythrina	Leguminosae	8	7,455	T, S
Eucalyptus	Myrtaceae	89	4,220,996	T,S
Eugenia	Myrtaceae	8	49,002	T,S
Euphorbia	Euphorbiaceae	2	14	S,H
Euphoria (Nephelium)	Sapindaceae	2	424	T
Eurya	Theaceae	1	2,100	T,S
Euterpe	Palmae	1	2	P
Fagraea	Loganiaceae	1	438	T
Feijoa (Orthostemon)	Myrtaceae	1	10	S
Ficus	Moraceae	36	128,694	T,S
Filicium	Sapindaceae	1	6	T
Firmiana	Sterculiaceae	1	1	T
Fitchia	Compositae	1	181	T
Flindersia	Rutaceae	3	4,093	T
Fortunella	Rutaceae	2	7	S
Fraxinus	Oleaceae	5	686,893	T
Galphimia	Malpighiaceae	1	71	S
Garcinia	Guttiferae	4	28	T
Gardenia	Rubiaceae	5	399	T,S
Gaussia	Palmae	1	2	P
Ginkgo	Ginkgoaceae	1	20	T
Gleditsia	Leguminosae	1	20	T

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera [2]	Family [3]	No. of species	No. planted	Growth form [4]
Gliricidia	Leguminosae	2	2,075	T,S
Gossypium	Malvaceae	4	323	S
Grevillea	Proteaceae	1	2,242,027	T
Grewia	Tiliaceae	1	100	T,S
Guaiacum	Zygophyllaceae	1	1,081	T
Guazuma	Sterculiaceae	1	394	T
Guilielma (Bactris)	Palmae	1	1	P
Gynocardia	Flacourtiaceae	1	766	T
Haematoxylon	Leguminosae	1	107,729	T
Hakea	Proteaceae	1	26	S
Harpullia	Sapindaceae	3	1,984	T
Hedera	Araliaceae	1	4	S
Hedychium	Zingiberaceae	1	650	H
Helianthus	Compositae	1	45	H
Hevea	Euphorbiaceae	1	51	T
Hibiscus	Malvaceae	8	8,027	T,S
Holmskioldia	Verbenaceae	1	2	S
Hopea	Dipterocarpaceae	3	3	T
Hovenia	Rhamnaceae	1	1	T
Hydnocarpus	Flacourtiaceae	4	10,207	T
Hymenaea	Leguminosae	1	12	T
Hymenosporum	Pittosporaceae	1	4	T
Hyophorbe	Palmae	1	6	P
Idesia	Flacourtiaceae	1	2	T
Ilex	Aquifoliaceae	5	268	T,S
Inga	Leguminosae	1	85	T
Intsia	Leguminosae	1	285	T
Ipomoea	Convolvulaceae	1	3	V
Ixora	Rubiaceae	3	9	S
Jacaranda	Bignoniaceae	1	7,166	T
Jacquinia	Theophrastaceae	*	11	T
Juglans	Juglandaceae	4	1,898	T,S
Juniperus	Pinaceae	6	7,687	T,S
Khaya	Meliaceae	2	115	T
Kigelia	Bignoniaceae	1	137	T
Kleinhovia	Sterculiaceae	1	14	T
Koelreuteria	Sapindaceae	2	447	T
Kokia	Malvaceae	*	297	T
Lagerstroemia	Lythraceae	5	5,219	T,S
Lagunaria	Malvaceae	1	6	T
Larix	Pinaceae	2	24	T
Latania	Palmae	1	6	P
Lecythis	Lecythidaceae	4	567	T
Leea	Vitaceae	1	1	S

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera 2/	Family 3/	No. of species	No. planted	Growth form 4/
Leptospermum	Myrtaceae	4	1,553	S
Lespedeza	Leguminosae	1	250	S
Leuceria	Compositae	1	3	*
Libocedrus	Pinaceae	1	631	T
Ligularia	Compositae	1	13	H
Linociera	Oleaceae	1	10,614	T
Lippia	Verbenaceae	1	28	S
Litchi	Sapindaceae	1	46	T
Lonicera	Caprifoliaceae	*	31	S,V
Lucuma	Sapotaceae	2	23	T
Luffa	Cucurbitaceae	1	4	V
Lupinus	Leguminosae	1	23	S
Lysiloma	Leguminosae	2	727	T
Macadamia	Proteaceae	1	20,411	T
Macaranga	Euphorbiaceae	3	545	T
Machaerium	Leguminosae	1	2,246	T
Maclura	Moraceae	1	229	T
Magnolia	Magnoliaceae	3	11	T
Malpighia	Malpighiaceae	1	14	S
Malus (Pirus)	Rosaceae	*	101	T
Mammea	Guttiferae	1	101	T
Mandevilla	Apocynaceae	1	2	S
Mangifera	Anacardiaceae	2	2,445	T
Manihot	Euphorbiaceae	1	24	S
Markhamia	Bignoniaceae	1	47	T
Martinezia	Palmae	1	2	P
Melaleuca	Myrtaceae	8	1,737,323	T,S
Melia	Meliaceae	1	46,186	T
Melicocca	Sapindaceae	1	30	T
Melochia	Sterculiaceae	2	5,705	T
Mesembrianthemum	Aizoaceae	*	52	H
Metasequoia	Pinaceae	1	39	T
Metrosideros	Myrtaceae	3	139	T
Mezoneuron (Mezoneurum)	Leguminosae	1	81	T
Millettia	Leguminosae	1	2	T
Mimosa	Leguminosae	1	111	T
Mimusops	Sapotaceae	2	1,900	T
Monstera	Araceae	1	87	V
Montezuma (Thespesia)	Malvaceae	1	24	T
Montrichardia	Araceae	1	4	S
Morinda	Rubiaceae	1	6	T
Moringa	Moringaceae	1	425	T
Morus	Moraceae	4	17,981	T
Mucuna	Leguminosae	1	1	V
Muntingia	Elaeocarpaceae	1	149	T

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera [2]	Family [3]	No. of species	No. planted	Growth form [4]
Murraya	Rutaceae	1	1,126	S
Musa	Musaceae	*	36	H
Musanga	Moraceae	1	7	T
Myoporum	Myoporaceae	1	16,723	T
Myrica	Myricaceae	3	2,695	T,S
Myrospermum	Leguminosae	1	20	T,S
Myroxylon	Leguminosae	1	970	T
Myrsine	Myrsinaceae	*	219	T,S
Neowawraea	Euphorbiaceae	1	28	T
Nerium	Apocynaceae	2	14	S
Nesoluma (Chrysophyllum)	Sapotaceae	1	7,029	T
Noronhia	Oleaceae	1	8,961	T
Nothocestrum	Solanaceae	*	2	T,S
Nyssa	Cornaceae	1	4	T
Ochna	Ochnaceae	1	2	S
Ochroma	Bombacaceae	1	1,471	T
Ochrosia	Apocynaceae	2	7	T
Olea	Oleaceae	2	1,810	T,S
Olneya	Leguminosae	1	30	T
Omphalea	Euphorbiaceae	1	2	*
Oncoba	Flacourtiaceae	2	20	T,S
Oreodoxa	Palmae	1	24	P
Ormosia	Leguminosae	1	12	T
Osmanthus	Oleaceae	1	181	T
Osteomeles	Rosaceae	1	504	S
Pachira (Bombax)	Bombacaceae	2	23	T
Pahudia	Leguminosae	1	128	T
Palaquium	Sapotaceae	1	16	T
Palagea (Palovea)	Leguminosae	1	25	T
Panax	Araliaceae	*	2	S
Pandanas	Pandanaceae	2	26,442	T
Parinarium	Rosaceae	1	1	T
Passiflora	Passifloraceae	1	14	V
Paulownia	Scrophulariaceae	1	206	T
Pelea	Rutaceae	*	10	T
Peltophorum	Leguminosae	1	10,154	T
Persea	Lauraceae	1	57,374	T
Phaeomeria	Zingiberaceae	1	153	H
Philadelphus	Saxifragaceae	1	2	S
Philodendron	Araceae	*	25	H,V
Phoenix	Palmae	*	34	P
Phormium	Liliaceae	1	718	H
Photinia	Rosaceae	2	166	S

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera 2/	Family 3/	No. of species	No. planted	Growth form 3/
Phyllocarpus	Leguminosae	1	4	T
Physalis	Solanaceae	1	18	H
Picea	Pinaceae	5	2,615	T
Pimenta	Myrtaceae	1	2,432	T
Pinanga	Palmae	1	8	P
Pinus	Pinaceae	46	437,588	T
Piper	Piperaceae	2	1,820	S
Piptadenia	Leguminosae	1	50	T
Pipturus	Urticaceae	*	10	T,S
Piscidia	Leguminosae	1	86	T
Pisonia	Nyctaginaceae	1	6	S
Pistacia	Anacardiaceae	*	25	T
Pithecellobium	Leguminosae	2	802	T
Pittosporum	Pittosporaceae	3	114	T,S
Plagianthus	Malvaceae	1	25	*
Planchonella (Sideroxylon)	Sapotaceae	1	2	T
Platanus	Platanaceae	2	521	T
Platymiscium	Leguminosae	2	5,597	T
Pleomele (Dracaena)	Liliaceae	2	723	T
Plumeria (Plumiera)	Apocynaceae	*	227	S
Podocarpus	Taxaceae	5	596	T
Poinciana (Delonix)	Leguminosae	1	173	T
Polyalthia	Anonaceae	1	55	T
Polygonum	Polygonaceae	*	2	S,V
Pometia	Sapindaceae	1	3	T
Pongamia	Leguminosae	3	90	T
Populus	Salicaceae	2	22	T
Posoqueria	Rubiaceae	1	247	T
Pothos	Araceae	1	1,083	V
Pritchardia	Palmae	*	1,092	P
Prosopis	Leguminosae	1	70	T
Prunus	Rosaceae	*	7,271	T
Pseudomorus	Moraceae	1	1	T,S
Pseudotsuga	Pinaceae	1	1,835	T
Psidium	Myrtaceae	3	26,840	T,S
Pteralyxia	Apocynaceae	1	35	T
Pterocarpus	Leguminosae	6	1,167	T
Ptychosperma	Palmae	*	151	P
Punica	Punicaceae	1	211	T,S
Pyracantha (Cotoneaster)	Rosaceae	2	338	S
Pyrus (Pirus)	Rosaceae	2	124	T
Quercus	Fagaceae	7	2,398	T
Rauwolfia	Apocynaceae	1	2	T
Ravenala	Musaceae	1	24	P

See footnotes at end of table.

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera [2]	Family [3]	No. of species	No. planted	Growth form [4]
Reynoldsia	Araliaceae	1	20	T
Rhamnus	Rhamnaceae	1	146	S
Rhododendron	Ericaceae	2	145	S
Rhus	Anacardiaceae	2	38	T,S
Ricinus	Euphorbiaceae	*	20	S
Robinia	Leguminosae	1	2,215	T
Rubus	Rosaceae	*	98	S
Sabal	Palmae	*	1,567	P
Salix	Salicaceae	3	130	T,S
Samanea (Pithecellobium)	Leguminosae	1	24,566	T
Sambucus	Caprifoliaceae	*	801	T
Sandoricum	Meliaceae	1	3,545	T
Santalum	Santalaceae	2	20,655	T,S
Sapindus	Sapindaceae	2	2,305	T
Sapium	Euphorbiaceae	1	8	T
Saraca	Leguminosae	1	1	T
Saxifraga	Saxifragaceae	1	2	H
Scaevola	Goodeniaceae	*	442	S
Scheelea (Attalea)	Palmae	1	1	P
Schinus	Anacardiaceae	2	13,759	T,S
Schotia	Leguminosae	1	1	T
Sequoia	Pinaceae	2	130,474	T
Sesbania	Leguminosae	2	1,121	T,S
Sicana	Cucurbitaceae	1	4	V
Sida	Malvaceae	*	2	S
Sideroxylon	Sapotaceae	1	1	T
Solanum	Solanaceae	8	1,675	T,H,S
Sophora	Leguminosae	4	514	T,S
Spathodea	Bignoniaceae	1	30,536	T
Spondias	Anacardiaceae	3	7,163	T
Stemmadenia	Apocynaceae	1	3	T
Stenocarpus	Proteaceae	1	2	T
Sterculia	Sterculiaceae	1	22	T
Straussia	Rubiaceae	*	24	T,S
Strelitzia	Musaceae	1	8	H
Streptosolen	Solanaceae	1	2	S
Strophanthus	Apocynaceae	*	4	S
Styphelia	Epacridaceae	1	10	S
Swietenia	Meliaceae	2	20,009	T
Syncarpia	Myrtaceae	2	99,358	T
Syzigium	Myrtaceae	1	143	T
Tabebuia (Tecoma, Cybistax)	Bignoniaceae	6	1,304	T
Tabernaemontana	Apocynaceae	*	1	S
Tamarindus	Leguminosae	1	1,235	T

See footnotes at end of table

Table 1.--Forest plantings in Hawaii by genera, 1908-1960[1], continued

Genera[2]	Family[3]	No. of species	No. planted	Growth form[4]
Tarrietia	Sterculiaceae	1	1	T
Tecoma (Tabebuia)	Bignoniaceae	5	5,946	T,S
Tetraplasandra	Araliaceae	*	8	S
Tetrazygia	Melastomataceae	1	8	*
Themeda	Graminae	*	201	G
Theobroma	Sterculiaceae	1	114	T
Thespesia	Malvaceae	1	10,647	T
Thevetia	Apocynaceae	2	5	S
Thrinax	Palmae	1	2	P
Thuja	Pinaceae	4	78,994	T
Tibouchina	Melastomataceae	3	1,007	S
Toona	Meliaceae	2	190,004	T
Tournefortia	Borraginaceae	1	1,376	T,S
Toxylon (Maclura)	Moraceae	1	8	T,S
Trachylobium	Leguminosae	1	41	T
Trema	Ulmaceae	2	31,462	T
Triplaris	Polygonaceae	1	274	T
Tristania	Myrtaceae	1	396,177	T
Tsuga	Pinaceae	2	21	T
Typha	Typhaceae	1	151	H
Ulmus	Ulmaceae	4	6,703	T
Vaccinium	Ericaceae	1	91	S
Veronica	Scrophulariaceae	1	172	H
Virgilia	Leguminosae	1	270	T
Vitex	Verbenaceae	5	10,619	T,S
Vitis	Vitaceae	*	82	S
Wallaceodendron	Leguminosae	1	1	T
Warszewiczia	Rubiaceae	1	167	S
Wikstroemia	Thymelaeaceae	*	396	S
Wilkesia	Compositae	1	142	S
Wormia (Dillenia)	Dilleniaceae	1	2	S
Wrightia	Apocynaceae	1	2	S
Xanthorrhoea	Liliaceae	1	20	H
Xylia	Leguminosae	1	66	T
Xylosma	Flacourtiaceae	*	4	T
Yucca	Liliaceae	1	12	T
Zizyphus	Rhamnaceae	1	51	T
Unidentified (Canal Zone)	*	1	15	*
Unidentified (Tongatabu #9530)	*	1	9	*

[1]Plantings of record by the Hawaii Division of Forestry.

[2]Recorded names have been corrected in cases of obvious error, and synonyms are provided to help identify some plantings.

[3]Dalla Torre and Harms (1900-1907) is the primary source of family names.

[4]T = tree, S = shrub, P = palm or palm-like, G = grass, V = vine, H = herb, F = fern.

*Not identified.

Table 2.--Tree species planted in Hawaii forests in numbers greater than 10,000, 1908-1960[1]

Species	Number planted	Species	Number planted
	Thousand		Thousand
Aberia gardneri	16	Eucalyptus stuartiana[2]	30
Acacia confusa	295	Eucalyptus umbellata (tereticornis)	53
Acacia decurrens	65	Eugenia cumini	11
Acacia decurrens var. dealbata	24	Eugenia jambos	29
Acacia koa	1,137	Ficus macrophylla	37
Acacia melanoxylon	17	Ficus nota	25
Albizia lebbekoides	10	Ficus rubiginosa	40
Albizia moluccana (falcata)	138	Fraxinus americana[3]	386
Albizia montana	145	Fraxinus uhdei	74
Aleurites moluccana	16	Grevillea robusta	2,242
Alnus nepalensis	43	Haematoxylon campechianum	108
Angophora lanceolata	20	Heliocarpus americanus	25
Araucaria cookii	22	Macadamia ternifolia	20
Araucaria excelsa	123	Melaleuca leucadendron	1,733
Casuarina cunninghamia	13	Melia azedarach	46
Casuarina equisetifolia	70	Morus nigra	16
Casuarina glauca	998	Myoporum sandwicense	17
Casuarina montana	32	Peltophorum inerme	10
Casuarina stricta	11	Persea americana	57
Cedrela odorata	26	Pinus caribaea	27
Chamaecyparis lawsoniana	52	Pinus elliottii	64
Cryptomeria japonica	499	Pinus patula	15
Cunninghamia lanceolata	11	Pinus pinaster	173
Cupressus arizonica	10	Pinus radiata	121
Cupressus macrocarpa	216	Psidium littorale	27
Enterolobium cyclocarpum	16	Samanea (Pithecellobium) saman	25
Eucalyptus camaldulensis	429	Santalum album	20
Eucalyptus citriodora	127	Sequoia sempervirens	130
Eucalyptus deanei	30	Spathodea campanulata	31
Eucalyptus maideni	36	Swietenia mahagoni	13
Eucalyptus marginata	17	Syncarpia hillii	16
Eucalyptus microcorys	102	Syncarpia laurifolia	83
Eucalyptus paniculata	138	Taxodium distichum	42
Eucalyptus pilularis	121	Taxodium mucronatum	17
Eucalyptus racemosa	33	Terminalia myriocarpa	26
Eucalyptus resinifera	91	Thespesia populnea	11
Eucalyptus robusta	2,321	Thuja plicata	76
Eucalyptus rudis	34	Toona ciliata var. australis	190
Eucalyptus saligna	437	Trema orientalis	31
Eucalyptus sideroxylon	151	Tristania conferta	396

[1]Plantings of record by the Hawaii Division of Forestry.

[2]Probably mostly *E. robusta*.

[3]Probably mostly *F. uhdei*.

Table 3.--Forest plantings in Hawaii by family[1], 1908-1960[2]

Family	Number of genera planted	Family	Number of genera planted
Cyatheaceae	1	Hamamelidaceae	1
Marrattiaceae	1	Platanaceae	1
Ginkgoaceae	1	Rosaceae	12
Taxaceae	2	Leguminosae	69
Pinaceae	20	Zygophyllaceae	1
Typhaceae	1	Rutaceae	8
Pandanaceae	1	Simarubaceae	1
Gramineae	3	Burseraceae	1
Cyperaceae	2	Meliaceae	10
Palmae	26	Malpighiaceae	2
Cyclanthaceae	1	Euphorbiaceae	15
Araceae	7	Anacardiaceae	6
Liliaceae	6	Corynocarpaceae	1
Amaryllidaceae	1	Aquifoliaceae	1
Musaceae	3	Celastraceae	1
Zingiberaceae	5	Aceraceae	1
Casuarinaceae	1	Hippocastanaceae	1
Piperaceae	1	Sapindaceae	11
Salicaceae	2	Rhamnaceae	4
Myricaceae	1	Vitaceae	2
Juglandaceae	2	Elaeocarpaceae	2
Betulaceae	3	Tiliaceae	1
Fagaceae	2	Malvaceae	11
Ulmaceae	3	Bombacaceae	7
Moraceae	10	Sterculiaceae	10
Urticaceae	1	Dilleniaceae	3
Proteaceae	5	Ochnaceae	1
Santalaceae	1	Theaceae	2
Polygonaceae	4	Guttiferae	4
Amarantaceae	1	Dipterocarpaceae	2
Nyctaginaceae	3	Bixaceae	1
Ranunculaceae	1	Cochlospermaceae	1
Magnoliaceae	1	Flacourtiaceae	6
Anonaceae	3	Passifloraceae	1
Lauraceae	2	Caricaceae	1
Papaveraceae	1	Begoniaceae	1
Moringaceae	1	Cactaceae	1
Saxifragaceae	3	Thymelaeaceae	1
Pittosporaceae	2	Lythraceae	1
Cunoniaceae	1	Punicaceae	1

See footnotes at end of table.

Table 3.--Forest plantings in Hawaii by family[1], 1908-1960[2], continued

Family	Number of genera planted	Family	Number of genera planted
Lecythidaceae	2	Labiatae	1
Rhizophoraceae	1	Solanaceae	7
Combretaceae	1	Scrophulariaceae	2
Myrtaceae	13	Bignoniaceae	10
Melastomataceae	2	Acanthaceae	3
Araliaceae	6	Myoporaceae	1
Cornaceae	1	Rubiaceae	10
Ericaceae	4	Caprifoliaceae	3
Epacnidaceae	1	Cucurbitaceae	3
Theophrastaceae	1	Campanulaceae	2
Myrsinaceae	2	Goodeniaceae	1
Sapotaceae	11	Compositae	9
Ebenaceae	1		
Oleaceae	5		
Loganiaceae	1		
Apocynaceae	14		
Asclepiadaceae	2		
Convolvulaceae	2		
Borraginaceae	2		
Verbenaceae	8		

[1]Families in order according to the Natural System of Classification of Engler (Dalla Torre and Harms 1900-1907).

[2]Plantings of record by the Hawaii Division of Forestry.

Addendum: Additional plantings of record to supplement Table 1

Genera	Family	No. of species	No. planted	Growth form
Chrysobalanus	Rosaceae	1	25	S
Chrysophyllum	Sapotaceae	1	455	T
Cinchona	Rubiaceae	5	6,880	T
Heliocarpus	Tiliaceae	1	24,666	T
Heritiera	Sterculiaceae	1	5	T
Hibiscadelphus	Malvaceae	1	34	T
Mahonia (Berberis)	Berberidaceae	1	9	S
Tamarix	Tamaricaceae	1	166	S
Taxodium	Pinaceae	2	58,801	T
Tectona	Verbenaceae	1	2,186	T
Tephrosia	Leguminosae	1	347	S
Terminalia	Combretaceae	7	27,725	T
Washingtonia	Palmae	1	3	P
Widdringtonia (Callitris)	Pinaceae	1	35	T

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